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ABSTRACT

A description is provided of a course, "Care of the Patient with Renal Disease," offered at the community college level to prepare licensed registered nurses to care for patients with renal disease, including instruction in performing the treatments of peritoneal dialysis and continuous ambulatory peritoneal dialysis (CAPD). The first sections of the description provide general course information, a list of units of instruction, a list of instructional materials, information on class assignments and clinical practice, and a glossary. The bulk of the paper consists of descriptions of the following course units: (1) Anatomy and Basic Physiology of the Kidney; (2) Renal Physiology and Fluid and Electrolyte Balance; (3) Acute Renal Failure; (4) Chronic Renal Failure; (5) Peritoneal Dialysis; (6) CAPD; and (7) Renal Transplantation. For each unit, a lecture outline, statements of goals and objectives, and a reading list are provided. Finally, grading and course revision are discussed. (LAL)

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NURSING 321A

CARE OF THE PATIENT WITH RENAL DISEASE:

Peritoneal Dialysis and Transplants

Valley Community College

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Submitted for Education 431B
Graduate School of Education
University of California, Los Angeles

1987

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This is the first course in a two course sequence to be taught at the community college level for licensed registered nurses interested in specializing in care of renal dialysis patients. This course is offered as part of the nursing curriculum. The course outline presented is for the first semester. The second course 321B focuses on actual performance of hemodialysis. Both 321A and 321B must be taken to complete the sequence and receive certification.

Class time is 2½ hours per week with a clinical component of 8 hours per week for the last eight weeks of the semester. Clinical settings will be arranged by the instructor with days arranged individually with students. The course is offered for six units.

The class is open to licensed registered nurses' who have an interest in this area of specialization. A minimum of six months experience in a hospital setting is preferred before enrolling in the course. Enrollment is limited to 30 students. An approximate drop rate of 20% is expected.

The goal of the course is to prepare registered nurses to effectively care for patients with renal disease including performing the treatments of peritoneal dialysis and CAPD. Nurses will also be instructed in the care of transplant patients. This is concurrent with the college goal of educating people in the community by offering professional/ occupational training and upgrading of skills.

The long range goal of the two part course is to prepare registered nurses to effectively function in hospital dialysis units, an acute setting and outpatient dialysis units, a chronic setting. They will also be trained to work with

transplant patients and certified to function as CAPD instructors. Within six months after completion of the sequence 90% of students are expected to be employed in one of the positions stated above.

AREAS OF INSTRUCTION

Class Week	Unit	Title
week 1	1	Anatomy and Basic Physiology of the Kidney
week 2	2	Physiology and Fluid and Electrolyte Balance
week 3	3	Acute Renal Failure
week 4		
week 5	4	Chronic Renal Failure
week 6		
week 7		Midterm Exam
week 8	5	Peritoneal Dialysis (16 hours clinical)
week 9		
week 10		
week 11	6	CAPD (24 hours clinical)
week 12		
week 13		
week 14	7	Renal Transplantation (24 hours clinical)
week 15		
week 16		Final Exam

Materials of Instruction

Texts

1. Lancaster, L.E. (ed.) The Patient with End Stage Renal Disease. 2nd ed., 1984.
2. Stroot, V.R., Lee, C.A., Barrett, C.A. Fluids and Electrolytes- A Practical Approach. 3rd ed., 1984.

A list of readings is listed after each unit.

Required articles will be found on reserve at the library.

Handouts for some of the readings will be provided in class.

Class Assignments/ Completion of Objectives

The course is divided into seven sections or "units". Each unit contains specific measurable objectives either as class quizzes, exams or out of class assignments. Each of the objectives must be completed to pass the course. Minimum limits are set for each objective. The grades of the midterm, final and clinical grade will determine letter grade. My goal as an instructor is to ensure every person in the class understands the material and is able to function competently as renal practitioners.

Clinical

I will try to arrange clinical times and placements to fit in with individual students schedules. Only day hours Monday through Friday can be arranged. I will hand out a questionnaire in a few weeks to help me gather information on days available and hospital choices.

Glossary

1. Access — (Vascular Access) A special blood vessel, created surgically for purposes of hemodialysis.
2. Anuria — Failure of the kidneys to produce urine.
3. ATN — Acute Tubular Necrosis Decreased blood flow through kidneys.
4. Bruit — Vibration or buzzung sensation felt over the vein of an access.
5. BUN — Blood Urea Nitrogen A metabolic end product of protein, not needed by the body, found in the blood.
6. Cadaver Kidney — A kidney taken from a person who has died.
7. Calcium (Ca) — A mineral found in the blood that is important to bone growth and formation, and body functioning.
8. Catheter — Placed in the body for passage of fluid.
9. Chronic Renal Failure (CRF) — The slow destruction of normal kidneys that occurs over months or years and results in permanent kidney failure. Acute renal failure is a sudden and possibly fatal stopping of the kidney function which occurs in days and hours.
10. Clearance — The elimination of substances from the blood by either kidneys, peritoneal dialysis or hemodialysis.
11. Creatinine (Cr.) — A waste product in the blood produced by normal tissue breakdown. It is removed from the bloodstream by the kidneys or dialysis.
12. Dialysis — A method used to remove waste products from the blood when the kidneys fail. The method may be peritoneal dialysis, hemodialysis or CAPD.
13. Dry weight — The weight at which blood pressure is normal or controlled and no edema is present.
14. Electrolytes — Elements in blood; sodium, chloride, potassium, calcium, and phosphorus are ex examples.

15. End Stage Renal Disease	ESRD; The stage of kidney failure that requires dialysis or kidney transplant to maintain life and health.
16. Hemodialysis	The process by which excess body wastes and fluid are removed from the blood by passage through an artificial kidney.
17. Hematocrit (hct.)	A measure of the amount of red blood cells.
18. Hemoglobin(hgb.)	A portion of red blood cells that carry oxygen from the lungs to the rest of the body.
19. Hypertension	High blood pressure. Some cases of hypertension can result in kidney damage and some cases of hypertension are caused by kidney damage.
20. Hypotension	Low blood pressure
21. Kidney treansplant	The surgical procedure which involves taking a kidney from the body of one person and placing it in the body of another person who has no kidney function. The kidney can be from a cadaver or family member.
22. Living related donor (LRD)	The person who donates his kidney to a related person needing a kidney tramsplant.
23. Nephrology	Science of the structure and function of the kidney.
24. Nephron	The functional unit of the kidney which acts to maintain the body's chemical balance. There are approximately one million nephrons in each kidney.
25. Peritoneal dialysis	The process by which excess body wastes and fluid are removed from the blood when passing through the abdominal peritoneal membrane by means of a special catheter. Peritoneal dialysis can be done manually, through use of a cycler or by CAPD.
26. Potassium (K)	A mineral found in many fruits and vegetables which is necessary for normal body function but harmful to the heart when found in excess. Controlling potassium levels in ESRD patients is very important.

27. Renal	Refers to the kidney.
28. Rejection	Destruction of grafted tissue. A kidney transplant rejection can occur by an acute or chronic process. This occurs when the recipient's body does not accept the new kidney.
29. Saline (N.S.)	A salt water solution.
30. Sodium (Na)	A mineral found in the body which helps regulate fluid content in the body.
31. Tissue typing	Lab procedure used to determine the degree of compatability between two persons of the organ donor and recipient.
32. Urea	One of the cheif waste products formed by metabolism or breakdown of protein in the body, which is normally removed by the kidney.
33. Uremia	Poisonous condition associated with loss of kidney function and the retention of waste products in the blood. The symptoms are weakness, nausea, itching, sleep disturbances, impaired memory and confusion.

UNIT 1

Anatomy and Physiology of the Kidney

To understand any concepts of renal disease the student must first understand normal anatomy and physiology of the kidney.

Lecture Outline

I. Introduction to Class

   A. Overview of Course

II. The Kidney

   A. Anatomy

   B. Physiology

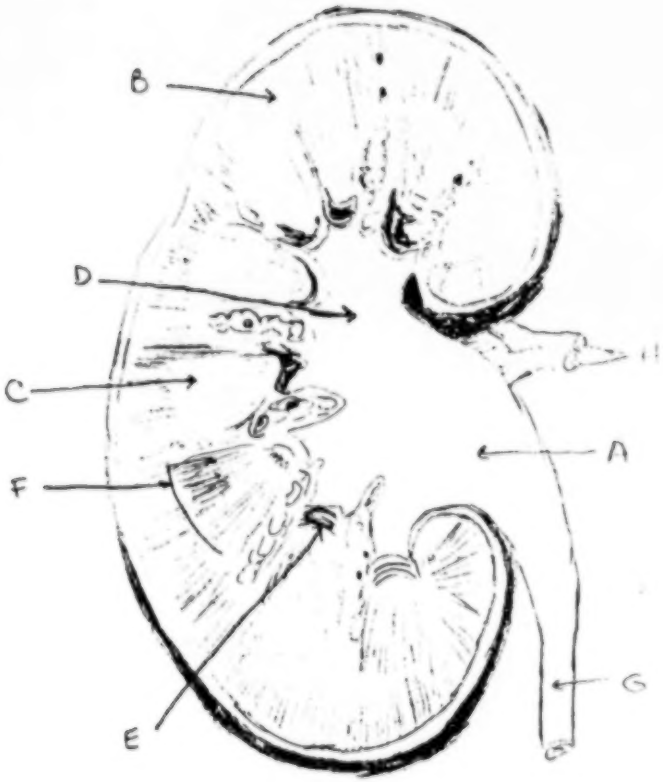
      1. Basic Principles of Renal Physiology

GOAL: The student will understand the anatomy of the kidney and basic principles of renal physiology.

OBJECTIVES: 1. In class, the student will correctly label a diagram of the kidney identifying six of the eight major components from memory.

2. In class, the student will complete a 20 question multiple choice quiz on basic renal physiology with 14 correct answers from memory.

Example of kidney diagram to be used for the first objective.



Example of multiple choice question for objective two.

1. What is the usual glomerular capillary pressure?

   a) 100mmHg b) 50 mmHg c) 10mmHg d) 75mmHg

Unit 1 Readings

1. Handout given in class on Anatomy of Urinary System (including diagrams).
2. Vander, Sherman, Luciano, Human Physiology The Mechanisms of Body Function, 3rd ed., 1980, p.366-378.
3. Price, S., & Wilson, L., Pathophysiology Clinical Concepts of Disease Process, 2nd ed., 1982, chap. 39, p. 486-508.

UNIT 2

Renal Physiology; Fluid and Electrolyte Balance

This unit continues with renal physiology including a review of fluid and electrolyte balance.

Lecture Outline

I. Regulation of Sodium and Water Balance

A. Basic Processes of Sodium, Chloride, and Water

1. ADH (Anti-Diuretic Hormone)

2. Renin-Angiotensin system

B. Water Balance-Osmolarity

1. Thirst

II. Regulation of Potassium, Calcium, and Hydrogen

A. Potassium

B. Calcium

1. PTH

2. Vitamin D

3. Calcium/Phosphorus Ratio

C. Acid/Base Balance

III. Fluid and Electrolyte Balance

A. Hyper/Hypovolemia (Water)

B. Hyper/Hyponatremia (Sodium)

C. Hyper/Hypokalemia (Potassium)

D. Hyper/Hypocalcemia (Calcium)

E. Acid/Base Balance

GOAL: The student will understand renal physiology with normal and fluid and electrolyte imbalances.

OBJECTIVE: The student will outside of class complete the readings and case studies in Stroot/Lee/Barrett.

Unit 2 Readings

1. Vander, Sherman, Luciano, Human Physiology The Mechanisms of Body Function, 3rd ed., 1980, p. 378-401.
2. Stroot, V.R., Lee, C.A., Barrett, C.A. Fluids and Electrolytes-A Practical Approach, 3rd ed., 1984. Chapters 1-10, p. 3-108.

UNIT 3

Acute Renal Failure

This unit begins the section on pathology of the kidney. This lecture will include a discussion on types, causes and treatments of acute renal failure.

Lecture Outline

I. Acute Renal Failure

- A. Definition
  - 1. How to recognize
- B. Pre-renal
  - 1. Causes and interventions
- C. Renal
  - 1. Causes and interventions
- D. Post-renal
  - 1. Causes and interventions

GOAL: The student will understand various pathological causes of ARF (Acute Renal Failure), how to recognize ARF and appropriate treatment and nursing interventions when the condition occurs.

OBJECTIVES:
1. The student will outside of class, write a nursing care plan for a patient with ARF from scenerio's given by instructor.
2. The student will in class complete a 25 question matching quiz with 18 correct responses from memory on ARF.

Example of scenario for objective one.

Mr. T.R. presents on your unit. He is a 45 year old male who has had the "flu" with nausea, vomitting, and diarrhea for three days. His temperature is 37.9, pulse 108, respiration 22, B/P 100/50. His skin is warm and dry. Lips and mucous membranes are dry. His BUN is 35, Na 138, K 3.0, CL 97, CO_2 42 Cr. 1.5. Urine Na is 12meq/L. Urine Osmolarity is 9meq/L. Urine specific gravity is 1.020. Volume/Output is decreased (less than 30ml/hour). Output in ER is 60cc in 3 hours. KUB is normal. Hgb is 14.2, hct. is 37%, WBC is 15,000. An 18G IV was started in ER. 200cc NS was given over 20 minutes with an urine output of 60cc. Admitting orders include: 1. $D_5\frac{1}{2}$NS20meqKCl at 250cc/hr for one liter, then 100cc/hr. Moniter urine output hourly. Call MD if urine output less than 30cc/hr, pulse less than 60 or greater than 130, B/P less than 80/60 or greater than 150/100, or temp. greater than 38.4. Redraw lytes, u/a and urine for Na or Osmolarity in 4 hours. Also draw BUN and Creatine. Write a nursing diagnosis and care plan for the scenario, due next week in class.

Example of question for second objective

1. a. pre-renal
   b. renal
   c. post-renal

1. dehydration
2. prostatic obstruction
3. ATN
4. kidney stone
5. acute GN
6. hypovolemic shock

Unit 3 Readings

1. Price, S., & Wilson, L., Pathophysiology Clinical Concepts of Disease Process, 2nd ed., 1982, chap. 44 p. 578-581.
2. Stark, J.L., How to Succeed Agaist Acute Renal Failure, Nursing '82, volume 12 number 7, July p. 26-33.
3. Stroot, V.R., Lee, C.A., Barrett, C.A. Fluids and Electrolytes- A Practical Approach, 3rd ed., 1984. Chapter 14.

UNIT 4

Chronic Renal Failure

This unit begins the "heart" of the course. It deals with a large amount of material on Chronic Renal Failure and End Stage Renal Disease. This unit will take three weeks to complete and covers all aspects in the care of the patient with Chronic Renal Failure(CRF).

Lecture Outline

Section 1

I. CRF

- A. Definition
- B. Overview of CRF
  1. pathophysiology of CRF
  2. causes of CRF
  3. End Stage Renal Disease (ESRD)
- C. Assessment if the patient with CRF
- D. Abnormals that are normal
  1. Lab Values

Section 2

II. Treating ESRD

- A. Dietary/Nutrition
- B. Medication Do's & Dont's
- C. Caring for hemodialysis patients
  1. Access Care
  2. Common problems with accesses
- D. Reasons for hospitalization

Section 3

III. Psychosocial implications

A. Denial

B. Anger

C. "Sick" Role

D. Non-Compliance

IV. Patient Teaching

A. What needs to be taught

B. Methods of Teaching

GOAL: The student will inderstand how to assess, plan, and implement care for the CRF patient.

OBJECTIVES: The student will in class complete a midterm exam on week 7 that will contain 35 questions (matching and multiple choice). Thirty of these questions will be on unit 4 material. There will also be a patient scenario that is to be answered as an essay question on CRF.

Examples of test questions for the midterm exam.

Matching

1. Amphojel
2. Demerol
3. Vancomycin
4. Apressoline
5. Benadryl
6. Lopressor

a. This antibiotic is commonly given to cover for staph/step infections in low doses after dialysis.

b. This antihistimine is given commonly to decrease itching.

c. This antacid is prescribed to bind phosphates to be given with meals.

d. This narcotic is to be used sparingly in renal patients because metabolites cause seizures.

e. This beta-blocker is given to decrease blood pressure.

f. This antihypertensive medication is commonly given IM when B/P needs to be quickly decreased.

Multiple choice

1. What is a "normal" sodium level for an ESRD patient?

   a) 125 b) 138 c) 150 d)100

Patient Scenario

1. Mr. Black is admitted to your unit. His B/P is 160/100, K-6.5, BUN 75, Cr. 12.4. He has never been seen for renal problems before. Physicians insert a subclavian catheter and begin

dialysis. Mr. Black is very angry about being on dialysis and is abusive to staff. How would you deal with Mr. Black?

Unit 4 Readings

Section 1

1. Handouts given in class
2. Price and Wilson chapters 41 and 42 p. 525-563.
3. Lancaster, L. The Patient With ESRD chap. 1
4. Stroot (etal) chap. 15

Section 2

1. Lancaster, Chaps. 6, 8, and 13
2. Price and Wilson chap. 43
3. Handouts given in class

Section 3

1. Lancaster chaps. 2,3,and 5
2. Articles and handouts given in class.

UNIT 5

Peritoneal Dialysis

This section begins the clinical component of the class. This unit requires 16 hours of clinical time. Objectives for clinical will be written seperately. The class focus is lecture and discussion of principles, problems and practice of peritoneal dialysis.

Lecture Outline

Section 1

I. Peritoneal Dialysis

A. What is it?

B. How do you do it?

C. Manual P.D.

Section 2

D. Use of Cyclers

E. Care of Tenkhoff Catheters

F. Common complications of P.D.

GOAL: The student will understand basic principles and problems associated with peritoneal dialysis.

OBJECTIVE: In class the student will complete a 30 question multiple choice and short answer quiz regarding peritoneal dialysis with 21 correct responses from memory after completion of both the lectures on the objective.

Examples of quiz items from the objective

1. What is the rationale for adding potassium chloride to the dialysate solution?
2. What is the correct temperature for dialysate solution to be before instilling into the patient?

   a. room temperature b. 37.0 C c. 45.0 C d. chilled

Clinical objectives for unit 5

GOAL: The student will understand and competently care for the patient on P.D.

OBJECTIVES: The student will according to policy and procedures of the institution:

1. Couple a patient to P.D.
2. Uncouple a patient from P.D.
3. Perform catheter care
4. State implications of lab values and perform appropriate interventions if necessary
5. State potential complications of P,D.
6. Recognize and intervene appropriately should complications occur
7. Set up the cycler correctly
8. State what the cycler alarms are for and what to check for and how to correct them when they occur.

All the objectives for each of the clinical units must be completed in the time alloted for each section. Evaluation and completion of objectives will be done by the preceptors in the clinical setting.

Unit 5 Readings

1. Lancaster chap. 9
2. Stroot (etal) chap. 20
3. class handouts and articles
4. ANNA guidelines of P.D.

UNIT 6

CAPD

This unit, CAPD (Continuous Ambulatory Peritoneal Dialysis) will prepare students to instruct patients in CAPD training. This unit takes three weeks to complete and 24 hours of clinical time.

Lecture Outline

Section 1

I. CAPD

A. Basic Principles

B. Why CAPD is functional

1. Cost

2. Self-care

3. Less dietary restrictions

C. Problems with CAPD

1. Peritonitis

2. Compliance

3. Catheter Problems

Section 2

II. Types and equipment of CAPD

A. Abbott

B. Travenol

C. Selecting patients for CAPD

Section 3

III. CAPD instruction

A. Teaching program

B. What to do on follow-up

GOAL: The student will understand how to perform, care for and instruct a patient in CAPD.

OBJECTIVES: 1. For section 1 the student will in class complete a 25 question short answer quiz with 18 correct responses from memory.

2. For section 2 the student will in class correctly demonstrate use of CAPD equipment

3. For section 3 the student will outside of class prepare a teaching plan for a CAPD patient.

Example of quiz question for objective 1.

Name three advantages and three disadvantages of CAPD.

Clinical objectives for unit 6

GOAL: The student will understand and competently care for the patient on CAPD

OBJECTIVES: The student will according to policy and procedure of the institution:

1. Change CAPD bag
2. Change connector tubing
3. Perform catheter care
4. State potential problems and appropriate interventions
5. Correctly interpret lab values
6. State when changes should be made in dialysis concentrations
7. Complete a portion of instruction for a patient undergoing CAPD training to be determined by preceptor
8. Assess two pateints on CAPD for follow-up

Unit 6 Readings

1. Lancaster, chap. 10
2. Articles, handouts from class
3. ANNA guidelines for CAPD

UNIT 7

Transplants

This is the last unit of the course. This unit will take three weeks to complete. It entails now transplant selection occurs, care of the newly transplanted patient, aomplications of transplants and rejection. This unit also includes 24 hours of clinical.

Lecture outline

Section 1

I. Renal Transplants

A. History

B. Types of transplants

C. Criteria for being considered for transplant

D. Work-up for living related donors.

Section 2

II. Care of the transplant patient

A. Post-op

1. First 48 hours

2. Medications

a. Cyclosporine

b. Prednisone/Solu-Medrol

c. OK-3

d. Immuran

e. others

3. Lab Values

4. Diagnostic Tests

a. ultrasound

b. renal blood flow

B. ATN

1. Treatment

Section 3

III. Complications of transplantation

A. Rejection

1. Acute

2. Chronic

3. Episodic

B. Recognizing and Treating Rejection

C. Infection

IV. Teaching the transplant patient

GOAL: The student will understand principles and care of transplant patients

OBJECTIVES: section 1 and 2 The student will outside of class complete a nursing care paln for tne renal transplant patient.

2. The student will in class on week 16 complete a final exam of 75 multiple choice, short answer, and matching questions. The material will be a synthesis of the entire course with 50 questions from units 5, 6 and 7. 51 of the answers must be correct for passing of the objective. The test will be from memory.

Examples of final exam questions

1. What is a acceptable cyclosporine level?

   a. 25 b. 50 c. 100 d. 275

2. Describe in a brief statement of 25 words or less the signs and symptoms of a rejection episode.

3. Match appropriate CAPD dialysate solutions to uses

a. 1.5	1. Used to pull off small volumes of fluid
b. 2.5	2. Used in maintenance of weight, for most exchanges
c. 4.25	3. Used to pull off larger volumes of fluid, mostly used as a night exchange bag.

Clinical objectives for unit 7

GOAL: The student will understand how to and competently care for the transplant patient.

OBJECTIVES: The student will according to policy and procedure of the institution:

1. Care for a trnasplant patient
2. Correctly administer cyclosporine to a patient
3. Teach a patient to administer cyclosporine
4. Correctly interpret lab values of a transplant patient
5. State rationale of giving Solu-Medrol and how it is given.
6. State implications of ATN and nursing interventions
7. Care for a patient admitted for a rejection episode
8. State implications and interventions in care of a patient experiencing rejection.

Unit 7 Readings

1. Lancaster chap. 11
2. Class ahndouts and articles
3. ANNA guidelines for the transplant

EVALUATION

A.Grading

Passing the course consists of completion of the objectives for each unit including the clinical component. Letter grades will be assigned from the midterm, final and clinical components using a scale of 70-79 C, 80-89 B, 90-100 A. The midterm and final are both worth 100 points. Completion and accuracy in all the clinical objectives will be worth an A for the clinical grade. Preceptors for clinical will meet the instructor to assign the clinical grade. Students will meet with each preceptor for each clinical unit and receive evaluation. Completion of class objectives will be done with a check system of scoring when completed for each unit.

B. Course Revision

Students will be asked to evaluate the instructor after each lecture and comments will be incorporated into subsequent lectures. Evaluation of the entire course will be incorporated into the next semesters course ouline. Adequate time is allowed for student questions in each lecture period. If the material is not covered the last unit may be dropped from the course. This would need to be decided with in the first five weeks of the course. Otherwise the pace will be kept up. Through use and completion of the objectives the overall progress of the class can be measured. If specific students are having problems they will be asked to attend a conference where reasons why will be explored. The instructor is willing to spend some time out of class tutoring students if the problems are from comprehension of the material. If 25% or greater of the class is having problems class time will be used to correct areas of concern.

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